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POPULAR AND PRACTICAL ENTOMOLOGY

NOTES ON SOME INSECTS AFFECTING NATIVE COTTONWOODS

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The cottonwood grows to a considerable size in the river bottoms in Alberta. It has a rapid growth, and this, together with the shade it affords renders it very valuable as an ornamental tree on the prairies. Trees planted ten and eleven years ago on the Experimental Farm at Lethbridge are now 10 to 15 inches in diameter. A feature of the trees' growth, which led to the following observations, is the cracking of the old bark, especially around the bases of the branches, and a constant exudation of sap. This is seasonal and apparently of not much consequence to the tree, though it should be mentioned in this connection that all the trees referred to are growing under irrigated conditions.

On June 28th, 1921, attention was drawn to large unsightly masses of faecal matter in the cracks of the bark, and on examining these, colonies of a noctuid larva were disclosed, apparently feeding on the bark. Examination of all the cottonwoods in the vicinity showed these colonies to be present in the cracks or in pruning wounds where the sap was exuding.

The larvae were closely packed together, were entirely concealed, and negatively phototropic. They were unable to crawl on the smoother surface of the tree, and once removed from the moist strands of old bark were unable to return.

Much of the fresh faecal matter was light green, which suggested that living tissues were being fed upon. Fresh intestinal contents showed cortical and xylem elements present which had all the usual appearances of living plant cells. It is apparent therefore, that the larvae do not confine their attentions to old bark, but feed on living tissues—apparently the scoring noticed on the new bark is a result of their activities. Specimens reared in the laboratory were fed on pieces of bark taken from the neighborhood of the colonies. About fourteen pupated, and several other pupae were obtained from the cottonwoods.

While looking for these latter, we found that numerous other forms of life inhabited these cracks in the bark. Mites, weevils, spiders, and many forms of dipterous larvae were abundant, as well as the pupæ of more than one species of noctuid moth. Some of these latter proved to be *Rhynchagrotis placida* Grt,

and two larger pupæ were obtained from which later a Catocala species emerged. The larvae of the last mentioned were also found on the tree and two individuals were found pupating under the bark.

The pupæ of the principal species mentioned in this article were found in the trees on July 1st, in cocoons made of old strands of bark intermingled with silk. Specimens reared indoors pupated July 10th and 11th. These specimens emerged from the 30th of July to the 5th of August and were determined by Dr. McDunnough as probably *Ufeus plicatus* Grt.

Control:—The question of the control of the *Ufeus* species was given attention during the summer. Of all the colonies examined, over 80 per cent. failed to mature through natural causes. *Apanteles* sp. emerged on July 10th, from a mass of cocoons attached to a dead larva. Such masses were present on most of the colonies. Tachinid larvae were taken from a diseased specimen during the examination of intestinal contents, and a tachinid puparium was obtained from one of the reared specimens. A disease, with symptoms very much like flacherie, accounted for many of the colonies, wiping them out completely. Where the sap ceased to exude before the colony was mature, the bark dried out and the colony died.

Mention might also be made of the fact that of five *R. placida* pupæ obtained, three produced very beautiful green-bodied hymenoptera, and an *Apanteles* sp. emerged from one of the *Catocala* larva after it had spun its cocoon. Artificial control experiments were not very satisfactory owing to the difficulty in maintaining controls. An ordinary hand sprayer was used and mixtures containing Paris green sprayed into the cracks where colonies existed, but without any effect whatever. Pieces of sodium cyanide placed in the cracks destroyed the colonies completely in twenty-four hours.

The best control, however, was the simple one of carefully pruning away the splitting bark from around pruning wounds and other places in the tree where the bark naturally breaks away. The adult of the larvae is evidently an opportunist, laying its eggs in these cracks as it finds them. Cleaning up such places improves the appearance of the tree, involves the destruction of all the season's hatch, and reduces future breeding places. As cottonwoods are usually grown in small numbers as shade trees and windbreaks, such a plan is practical.

The tree survives the presence of the colonies, but the larvae spoil its appearance, with masses of faecal matter, and keep wounds open, causing decay. Several trees were noticed in which such places were full of water, and harbored numberless dipterous larvae which fed on the decaying matter.

The tree, once it attains a fair size is apparently immune, as none of the mature trees in the river bottom at Lethbridge showed any sign of the presence of larvae.

The habits of *Ufeus* in thus using cottonwoods as a breeding ground is apparently of wide occurrence, since in Montana *Ufeus* on cottonwoods is reported in several of the yearly reports of that state.

SOME NEW AND RARE COLEOPTERA FROM SOUTHWESTERN FLORIDA

BY W. S. BLATCHLEY,

Indianapolis, Ind.

(Continued from Page 14)

Eros trilineatus Melsh.—An individual of this species was taken at Dunedin having the left elytron only two-thirds the length of the right one.

Chauliognathus marginatus Fab.—Examples of this common species are at hand from Miami and Everglade having the thorax entirely yellow and the black spots on head very small.

Belotus (*Lobetus*) *abdominalis* (Lec.)—Taken at Dunedin in some numbers, April 10—15, by sweeping the new low vegetation on lots which had been recently burned over. Schwarz records it as "common on swampy meadows in June."

Attalus australis sp. nov.

Oblong-oval, wider behind. Black, strongly shining, elytra faintly tinged with blue; femora shining black; labrum, palpi, antennae, tibiae and tarsi, pale reddish-yellow; upper surface thinly clothed with sub-erect grayish pubescence. Head wider than long, narrower than thorax, almost impunctate; eyes large, prominent; antennae reaching middle of body, male, base of thorax, female; rather stout, not serrate, the joints one-half longer than wide. Thorax suborbicular, two-thirds wider than long, front margin truncate, disc very minutely and sparsely punctate. Elytra not wider at base than thorax, gradually expanding and widest about apical third, finely but more distinctly punctate than thorax, each puncture, as there, bearing a sub-erect grayish hair. Length 1.3-1.8 mm.

Swept in some numbers, Feb. 21-27, 1919, from low vegetation along the inner margin of the beach at Cape Sable. The pale tibiae and tarsi contrast strongly with the black femora. The blue-black upper surface and posteriorly widened elytra give it the appearance of a *Pseudobaeus*, but the male and female elytra are similar in form.

Melyrodes (*Melyris*) *basalis* (Lec.)—One specimen taken at Dunedin, April 11, by sweeping ferns in Skinner's Hammock. The only other definite Florida record is that of Dozier[14] who has taken it at Gainesville.

Cymatodera undulata (Say)—One specimen at Dunedin, February 23, by beating bunches of Spanish moss. No previous Florida record except that of Leng in his Catalogue.

Thanasimus dubius (Fab.)—One, February 17, beneath a stick of corded pine wood near Dunedin. The first record for the State, though the general range is given by Leng as Canada and New England to Mexico.

Hydnocera humeralis Say.—One, April 12, at Dunedin by sweeping low vegetation in dry, sandy soil. No previous definite station record for the State.

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[14]Ent. News, XXIX, 332.

Zonitis schæfferi sp. nov.

Elongate, subcylindrical. Head yellow, with a large subquadrate piceous spot between the eyes; antennae piceous, the basal joints black; thorax yellow with a rosaceous tinge; elytra piceous, with narrow sutural, median and marginal stripes yellow; under surface and legs black, shining, the trochanters wholly, and coxae in part, yellowish. Head subquadrate, coarsely and densely punctate; eyes transverse, widely separated above and beneath; antennae stout, slightly less than half the length of body. Thorax slightly wider than long, sides almost straight from base to apical third, hind angles rounded, disc densely and coarsely punctate, a median impressed line on basal half. Elytra densely and coarsely rugose-punctate. Under surface rather finely, not densely punctate; last ventral with a very broad U-shaped emargination. Length 9 mm.

Described from a single male beaten, February 9, from dead vines by the side of a roadway running through Skinner's hammock near Dunedin. In form and sculpture it resembles *Z. longicornis* Horn, but the antennae are stouter and much shorter and they and the legs are almost wholly blackish. The median discal stripe of elytra narrows gradually from the base and does not reach the apex. Named in honor of Chas. Schæffer of Brooklyn, New York, who, by his careful and discriminating studies has done much to advance our knowledge of the Coleoptera of North America.

Phomalus (*Xylophilus*) *brunnipennis* (Lec.)—A single specimen was beaten from a bunch of Spanish moss near Dunedin, on March 23. This is the first Florida record, though it is said to range from the District of Columbia and Indiana to Southern California. It is placed in the family Euglenidae by Leng.

Drapetes geminatus Say.—

Drapetes quadripustulatus Bonv.—While these two species have been mentioned as occurring in Florida by a number of persons, definite recorded stations from the State are very few. One specimen of each has been taken at Dunedin, *geminatus* on April 14 by sweeping ferns in a dense wet hammock, and *quadripustulatus* on April 12 from a low huckleberry on dry sandy soil. Schwarz records both as "very rare," *geminatus* from Enterprise and *quadripustulatus* from Tampa.

Buprestis striata impedita Say.—One example of this handsome Buprestid was taken March 7, from a window of my residence in Dunedin. Not before known from Florida, and perhaps an adventive.

Cyphon americanus Pic.—This is the *C. impressus* Lec. described[15] in 1878 from specimens taken by Schwarz on swampy meadows at Tampa and Enterprise, and not since recorded from the State. It occurs in small numbers about Dunedin in April, in company with *C. variabilis* Horn, on the flowers and foliage of huckleberry. LeConte's name was preoccupied. Schæffer (Ms.) states that, "as far as known, the elytral impressions are present only in the females."

Trogoderma flabellata sp. nov.

Oblong-oval. Black, shining, rather densely clothed with fine pubescence which is blackish and suberect on head and thorax, yellowish and subprostrate

[15]Proc. Amer. Phil. Soc., XVII, 405.

on elytra; each elytron with a narrow irregular orange-red band just in front of middle, this concave behind and widest near the suture; femora and antennae fuscous; tibiae and tarsi reddish-brown. Head densely and finely punctate; eyes entire, separated by three times their own diameter. Antennae flabellate, the branches of joints 4 to 10 three or four times the length of the segments, those of two and three shorter. Thorax about twice as wide as long, sides broadly rounded, base as wide as elytra, strongly bisinuate, disk densely and finely punctate. Elytra conjointly scarcely twice as long as wide, finely and rather closely aciculate punctate. Prosternum very coarsely and closely punctate, the process feebly carinate. Length 2.1-2.3 mm.

Described from two males, one taken at Dunedin, February 14, the other at Caxambus, March 9; both by sweeping low shrubs along tidewater lagoons. In general appearance this is a miniature of my *T. fascifera*, but the flabellate antennae, narrower cross band of elytra, more coarsely punctate prosternum and much deeper antennal fossae are, in addition to its small size, distinctive characters.

Trogoderma fascifera Blatch.—A second male of this species was beaten, March 22, from dead leaves of a cabbage palmetto on Hog Island. The unique type was from the shore of Lake Istokpoga.

Tenebroides obtusus (Horn.)—One specimen, January 21, from beneath bark of a pine block at Dunedin. Described[16] from Pennsylvania and District of Columbia, and not heretofore known from Florida.

Lophocateres pusillus (Klug.)—One specimen, February 6, from beneath a board lying on the ground in a barnyard near Dunedin. An introduced species originally described from Siam, and known in this country from South Carolina, Louisiana and Texas.

Cybocephalus nigritulus Lec.—Examples of this minute Nitidulid have been taken on Hog Island opposite Dunedin, in February and March, by beating the Florida button-bush, *Conocarpa erecta L.*

Lathropus vernalis Lec.—One specimen swept, March 29, from huckleberry blossoms near Dunedin. Hitherto known from the State only from Crescent City.

Aulonium tuberculatum Lec.—Several specimens were taken near Dunedin in January, in company with *Lasconotus pusillus* Lec., and *Hypophloeus thoracicus* Melsh., beneath the bark of freshly cut pine blocks. It is noted in the Schwarz Manuscript as found at Jacksonville by Ashmead.

Monocdus guttatus Lec.—A number of examples were taken at Chokoloskee by beating its host plant, the slender twining milkweed, *Metastelma scoparium* Nutt. In normal specimens the body is covered with a whitish waxy secretion. In some of those from Chokoloskee this was lacking and the usual small scattered dark spots of elytra were very faint or wholly wanting.

Alphitobius piceus (Oliv.)—Nearly a hundred specimens of this cosmopolitan species were taken March 9 in company with scores of *Dryotribus mimeticus* Horn from beneath two pieces of decaying lumber near an old sugar furnace at Caxambus. Single specimens have also been found on two occasions at Dunedin.

[16]Proc. Acad. Nat. Sci. Phil., 1862, 87.

Ptinus constrictus sp. nov.

Elongate, subparallel. Dark reddish-brown, the antennae, legs and under surface slightly paler. Head coarsely and densely punctate, clothed with suberect yellowish bristle-like hairs; occiput with a deep median groove; eyes quite prominent, coarsely facetted; antennae three-fifths the length of body, joints 2 and 3 each two-thirds the length of 4, 4 to 11 subequal, densely pilose. Thorax subcylindrical, strongly constricted near base, both disc and constriction densely and coarsely punctate, the former bearing each side near the middle a triangular tuft of stiff yellowish hairs. Elytra three times as long as broad, sides parallel; striae feebly impressed, marked with rows of fine, close-set punctures; intervals about twice the width of the striae, each with a row of minute punctures, the punctures of both striae and intervals each bearing an inclined yellowish hair. Sterna smooth, glabrous; abdomen thickly clothed with fine yellowish pubescence. Length 2.6 mm.

A single male was beaten, March 15, from dead branches in a partially cleared mangrove swamp on Chokoloskee Island. Mr. Fall, to whom it was submitted, stated that in his table[17] it should probably be placed between *strangulatus* and *falli*.

Onthophagus alutaccus Blatch.—This species was described[18] from a unique. taken on the wing at Dunedin. A second specimen was obtained January 21, by beating the foliage of a water oak near the bay front, one mile north of the town. The representatives of the genus usually occur on the ground about carrion, horse dung and other refuse.

Ligyrus subtropicus sp. nov.

Oblong, suboval, very robust, convex. Above piceous-black or very dark chocolate-brown, strongly shining; under surface and appendages dark reddish-brown. Head at widest part two-fifths the greatest width of thorax, finely and shallowly rugulose; clypeus subtriangular, its sides rapidly converging from the very broad base, its apex bifid, the teeth upturned and well separated, extreme base with two blunt tubercles behind which the interocular space is visibly concave. Thorax one-third wider than long, sides broadly curved, hind angles rounded, disc finely, sparsely, irregularly aciculate-punctate and very minutely alutaceous; front margin with a short blunt median tubercle behind which is a shallow oval pit or impression, this punctate like the disc. Elytra as wide at base and just twice as long as thorax, their tips broadly rounded and exposing both the last dorsal segment and the very large pygidium; disc with sutural striae well marked, the others feeble and irregular, all with coarse punctures extending throughout the length; first, third and fifth intervals much wider than the others, and with numerous confused punctures as coarse as those of the striae. Pygidium minutely scabrous at base, elsewhere very finely and sparsely punctate. Ventral abdominal segments very finely and remotely punctate, each with a single interrupted transverse row of much coarser punctures. Middle of prosternum and median tubercle behind the front coxae each with a tuft of

[17]Trans. Amer. Ent. Soc., XXXI, 1905, 113.
[18]Can. Ent., LI, 1919, 31.

long reddish bristles. Front tibiae with three large anterior teeth and a very small posterior one. Length 27 mm., width 13 mm.

A single female of this large Scarab was taken at light at Dunedin, June 4, 1913, and has since been in my collection without a name. I finally sent it to Mr. Fall, who returned it as a "*Ligyrus* near to *bryanti* Rivers, which it is not." Col. Casey then passed judgment upon it as follows: "Your specimen belongs to my subgenus *Grylius* and represents a species near to the Florida individual described by me[19] as *laevicollis* Bates, but is a different species. It is larger and much stouter, has coarser elytral punctures and a different form of pronotal apical impression."

Euphoria sepulcralis floridana Casey.—The types of this sub-species[20] were from the "East Coast of Florida, Jacksonville to Palm Beach." A specimen at hand was taken at Ocala on April 14.

Euryptera lateralis (Oliv.)—A dozen examples of this handsome Lepturid were taken February 21 from the blossoms of a Cherokee rose, in my lot at Dunedin. It is listed by Schwarz as "very rare" at Tampa and Enterprise, and has been taken also at St. Augustine and Crescent City.

Euryptera flavatra Blatch.—A second example of this bicolored species was taken from a blossom of the same rose on April 9. Only the unique type, described[21] from Dunedin, was previously known.

Leiopus maculipennis sp. nov.

Oblong, moderately robust. Above dull reddish-brown, thickly and evenly clothed with short, prostrate grayish-yellow hairs, with small patches of white and black ones intermixed; the white patches alternating with the black along each sutural carina, forming a narrow, much interrupted bar across elytra at apical third, and sometimes another half way between it and apex, the black patches arranged in four rows as suberect tufts along the disc of each elytron; antennae and legs indistinctly but perceptibly annulate, the apical third of middle and hind tibiae fuscous; under surface piceous, thickly clothed with long grayish hairs. Antennae surpassing tips of elytra 3-5 mm., the basal joint thick, subclavate; second one-fourth longer than any which follow, these being subequal. Thorax more than one-third wider than long, sides almost straight from apex to summit of lateral tubercle, which is short, subacute and placed at basal fourth; disk very finely and densely punctate. Elytra one-third wider at base than thorax, sides straight to apical third, tips subtruncate, the sutural angle slightly prolonged; disk finely and rather sparsely punctate. First joint of hind tarsi as long as the next two. Length 5.5-6.5 mm.

Described from ten specimens taken at Dunedin; one December 5, the others between March 12 and April 19. Occurs on dead vines and twigs in dense hammocks. This species has been in my collection unnamed since 1916, and specimens have been compared with those of all other species in the Horn and LeConte collections at Philadelphia and Cambridge, and also by Mutchler

[19]Memoirs VI, 1915, 190.
[20]Memoirs VI, 1915, 321.
[21]Can. Ent. XLVI, 1914, 92.

with those in the American Museum. It belongs in the group with *crassulus* and *centralis* Lec., but differs from all our described species in lacking all trace of dark bands on the apical half of elytra, in the very distinct and handsome maculation of the sutural carinae, etc.

Oberea flavocephala sp. nov.

Elongate, subcylindrical. Black, strongly shining, thinly clothed with minute grayish pubescence and scattered erect black hairs. Head and thorax bright yellow, the former with two spots on occiput, one behind each eye and labrum and mandibles black; thorax with two large callosities, a small subquadrate spot in front of scutellum and a triangular one each side on lower posterior flank, shining black; tibiae and tarsi piceous. Head coarsely and densely punctate; antennae a little shorter than body, the outer joints slightly stouter than the third and fourth. Thorax coarsely and closely punctate, the two black callosities twice or more as large as in *bimaculata*, each circumscribed near the edge by a series of very coarse punctures. Elytra with rows of coarse, dense punctures, the intervals very narrow, the third slightly raised nearly throughout its length; tips truncate, their inner and outer angles distinctly produced or dentiform. Abdomen finely and very sparsely punctate. Length 8.5-9.5 mm.

Two swept from low herbage along the margin of a dense hammock near Dunedin, April 9-24; one from Ormond, April 14. The Ormond specimen, taken in 1913, was labelled *bimaculata* Oliv., but on taking the two Dunedin examples I saw that they differed widely from that species in the yellow head, large coarsely punctate thoracic callosities and armed elytral tips. It is evidently allied to *insignis* Casey[22] from North Carolina, but that is a larger species with rounded spot in front of scutellum and elytral tips unarmed.

Cryptocephalus calidus Suffr.—This species occurs in dry localities about Dunedin during December and January, on the foliage of huckleberry and other low shrubs. I first recorded it from there in 1917, but Leng does not definitely include Florida in its distribution.

Cryptocephalus aulicus Hald.—Three specimens were swept on April 8, from low vegetation along the edge of a hammock.

Disonycha caroliniana (Fab.)—In the Schwarz Manuscript this species is mentioned as occurring at Enterprise and Ft. Capron. A single specimen was taken December 16 by sweeping near Dunedin.

Colaspidea insularis sp. nov.

Oblong-oval, convex. Brown with a shining brassy tinge, antennae, tibiae and tarsi paler; surface sparsely but evenly clothed with white scale-like hairs. Head with front finely and sparsely punctate, and with a broad, shallow median impression; antennae slender, reaching middle of elytra, joint two equal in length but more slender than one, curved, 3-6 subequal to two, 7-10 stouter, subequal in length. Thorax one-half wider than long, its front margin curved and somewhat projecting to cover occiput; sides broadly rounded, disk finely

[22]Memoirs IV, 370.

not closely punctate. Elytra conjointly oval, one-fourth wider at base than thorax, umbone prominent; disk evenly, closely and rather finely punctate, the umbone and three or four elongate calloused spaces near middle of each elytron smooth. Under surface very finely and sparsely punctate; prosternum forming a large flat quadrate plate between the front coxae. Length 2.7-3 mm.

Described from three specimens from the Isle of Pines received, among other material for naming, from Prof. J. R. Watson, of the Florida Agricultural Experiment Station. They were labelled "on citrus," and Prof. Watson writes that he has considerable correspondence with citrus growers on the Isle of Pines, who are unable to get satisfaction from the Cuban station. Four species of *Colaspidea* have hitherto been described from North America, all from Southern California or adjacent islands. According to Horn,[23] others are known "from Southern Europe and the circum-Mediterranean region generally." Since Leng and Mutchler mention no species of the genus in their list of West India Coleoptera, *insularis* is apparently the first one to be known from the Atlantic region of North America.

Haltica schwarzi Blatch.—Described[24] from the east shore of Lake Okeechobee. Two specimens were secured on March 4 while sweeping low huckleberry near the edge of a brackish water marsh just east of Ft. Myers.

TWO FAMILIES OF INSECTS NEW TO BRITISH TERTIARY STRATA

BY T. D. A. COCKERELL,
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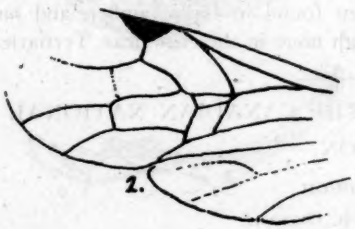
When recently examining some hitherto overlooked fossil insects in the British Museum, I found two specimens collected by Mr. a'Court Smith in the Isle of Wight, representing families not yet recorded from the British Tertiary rocks. They come from the Bembridge series, at the famous Gurnet Bay locality.



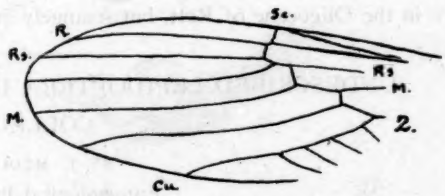


Fig. 1, wing of *Vectevania vetula*; Fig. 2, wing of *Nemoura priscula*.

EVANIIDAE.

Vectevania n. gen.

Related to *Protofoenus* Ckll., from Burmese amber, but differing especially in the complete third discoidal cell and the deep triangular stigma. The second transverse-cubital nervure is so faint as to be practically obsolete, and there is perhaps a slight indication of the third, too vague to be positively recognized.

[23]Trans. Amer. Ent. Soc., XIX, 1892, 204.
[24]Can. Ent., XLVI, 1914, 141.

The position of the second is as in the living *Neuraulacinus braunsi* Kieffer. The small cuneiform first discoidal cell is characteristic, and the comparatively distinct venation of the hind wings is a primitive feature, lost in the modern *Aulacinus*, but preserved in *Neuraulacinus*.

Vectevania vetula n. sp.

Head narrower than thorax; thorax elongate-oval, 2 mm. long; abdomen claviform, nearly 3 mm. long, obtuse at apex; anterior wing about 4.5 mm. long, clear hyaline, with ferruginous nervures; stigma margined with brown, apparently originally all brown.

British Museum, In. 20535.

PERLIDAE.

Nemoura (sens. lat.) **priscula** n. sp

Anterior wing, length about 5.4 mm., width nearly 2 mm; colorless. About 1.7 mm. of the base is lost. The venation is very simple, but similar in principle to that of *Nemoura*. From the fork of the radial sector to the apex is nearly 3 mm. Comparing the venation with recent species, I found nothing very close, and it is probable that a distinct genus is indicated. Some of the species from Prussian amber are interesting for comparison. Thus *Taeniopteryx elongata* Berendt has the cross-nervure at the end of the subcosta, but it is oblique. *Leuctra gracilis* Berendt and *Leuctra lincaris* Berendt have this cross-nervure well before the end of the subcosta, in *gracilis* producing an angulation of the subcosta, but not in *lincaris*. On the other hand, *L. gracilis* agrees with the English fossil in having the cross-vein connecting R with R_3 beyond the fork of R_3; in the other two amber species it is at the fork. Our fossil nearly agrees with *L. gracilis* in the position of the cross-vein between R_3 and M.

British Museum, In. 17498.

Thirteen species of Perlidæ have been found in Baltic amber, and one in the Oligocene of Rott, but strangely enough none in the American Tertiaries.

UNDESCRIBED LEPIDOPTERA IN THE CANADIAN NATIONAL COLLECTION.

BY J. MCDUNNOUGH,

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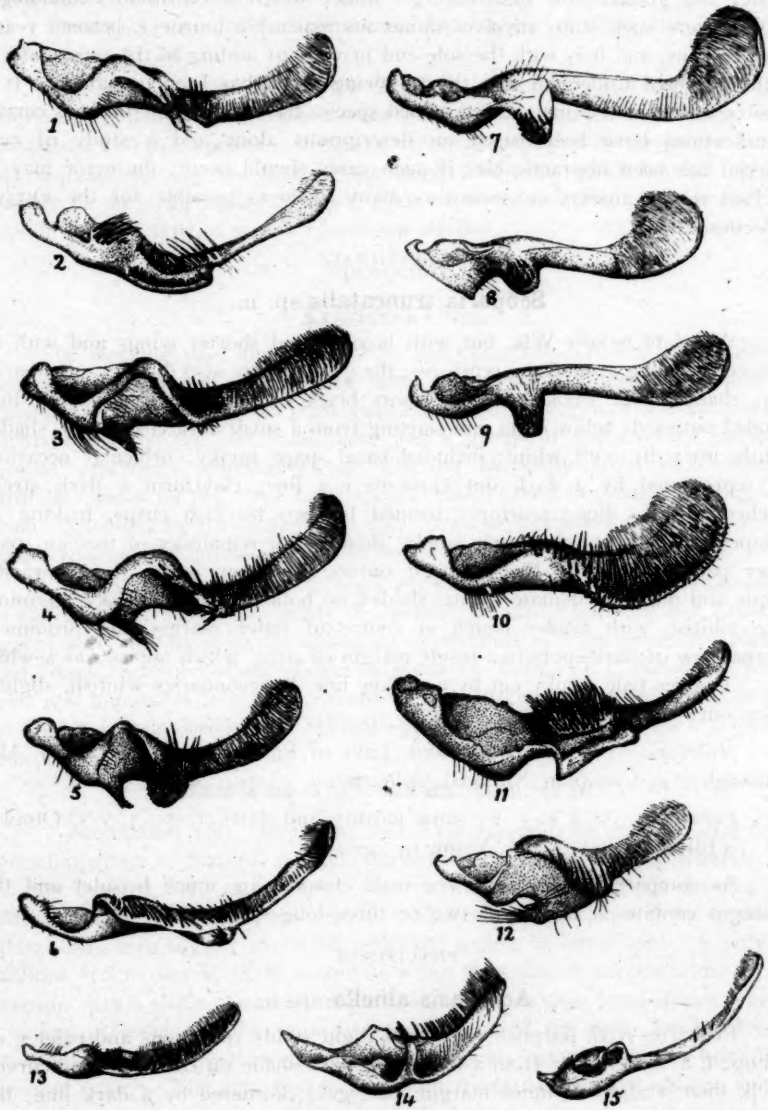
For some time there has been a strong feeling among Canadian entomologists that the types of as many as possible of our Canadian insects should be deposited in the National Collection at Ottawa. During the past half century, owing to the lack of taxonomists in Canada, a large proportion of Canadian insect material has been sent to the United States or Europe for identification and as a result the types of numerous undescribed species have been retained in these countries. With the growth of taxonomy and the discovery of numerous closely allied forms which heretofore had been grouped

*Contribution from the Entomological Branch, Department of Agr., Ottawa

CAN. ENT. VOL. LIV. PLATE I.



UNDESCRIBED LEPIDOPTERA.

Male clasper of 1. *Exartema permundanum* Clem.; 2. *E. troglodanum* n. sp.; 3. *E. furfuranum* n. sp.; 4. *E. rusticanum* n. sp.; 5. *E. bolanderanum* n. sp.; 6. *E. terminanum* n. sp.; 7. *Argyroploce youngana* n. sp.; 8. *A. deceptana* n. sp.; 9. *A. tertiana* n. sp.; 10. *A. buckellana* n. sp.; 11. *A. polluxana* n. sp.; 12. *A. castorana* n. sp.; 13. *A. aspasiana* n. sp.; 14. *A. carolana* n. sp.; 15. *A. vulgana* n. sp.

under a single specific name, the necessity for a study of type material becomes greater and greater; the disadvantages under which a Canadian entomologist labors, where such study involves numerous expensive journeys, become yearly more obvious, and it is with the sole end in view of adding to the type material in the National Collection that the following paper has been prepared. It is possible that in a few instances a named species has been redescribed, as certain identifications have been based on descriptions alone and a study of type material has been impracticable; if such cases should occur, the error may be ascribed to my anxiety to secure as many types as possible for the Ottawa Collection.

SCOPARIINAE.

Scoparia truncatalis sp. n.

Allied to *basalis* Wlk. but with broader and shorter wings and with no olivaceous scaling around the reniform; the genitalia are also distinct. Primaries gray, shaded with smoky; a very short black basal dash; a dark t. a. line, rounded outwards below costa and starting from a small dark costal spot, shaded slightly inwardly with white; included basal space smoky; orbicular occasionally represented by a dark dot close to t. a. line; claviform a dark streak attached to t. a. line; reniform formed by two blackish cusps, making an x-shaped mark; above this some smoky shading but remainder of median space rather pale gray; t. p. line rounded outwardly below costa, then inwardly oblique and minutely dentate, white, shaded on both sides with smoky; terminal space whitish with smoky blotch at centre of outer margin and prominent terminal row of dark spots just inside margin of wing, which appears as a white line. Fringes pale smoky cut by a darker line. Secondaries whitish, slightly smoky outwardly. Expanse 15 mm.

Holotype,—1 ♂, Norway Point, Lake of Bays, Ont. (July 12) (J. McDunnough), in Canadian National Collection.

Paratypes,—6 ♂'s, 1 ♀, same locality and date; 1 ♂, 3 ♀'s, Ottawa, Ont. (July 5, 9, 11) (C. H. Young).

As compared with *basalis* the male claspers are much broader and the aedoeagus contains a bundle of two or three long spines.

PHYCITINAE.

Acrobasis alnella sp. n.

Primaries dark purplish gray with slight ruddy reflections and paler gray shading; t. a. line arising from a triangular dark shade on costa, well outcurved to cell, then straight to inner margin, pale gray, bordered by a dark line; the space between it and the dark basal scale-ridge dull clay color, median space with paler gray shading below costa and two superimposed black discal dots; t. p. line straight below costa, bulging gently opposite cell and finely dentate, whitish, bordered inwardly by a dark line. A dark terminal line. Secondaries dull smoky. On the underside the male is without black markings. Expanse 17-22 mm.

Holotype,—1 ♂, Ottawa, Ont. (July 9) (J. McDunnough), bred from Alder, in Canadian National Collection.

Paratypes,—4 ♂'s, 3 ♀'s from the Ottawa region, bred from Alder on various dates in July.

The species is closely allied to *betulella* but smaller and shows genitalic differences, notably in the much smaller gnathos; the cocoon is oval, much like a miniature *betulella* cocoon. From *rubrifasciella*, also an *Alnus* feeder, it is at once distinguished by the lack of the bright red antemedian band. It may possibly be *normella* Dyar, the food plant of which was not given in the description and the type of which I have not studied.

EUCOSMIDAE.

Exartema Clem.

In working over the material in the Canadian National Collection belonging to this genus (i. e. species with a cylindrical appendage at base of secondaries in the male sex) an examination of the genitalia soon made it apparent that on the one hand there was a group of species very similar in general superficial appearance but differing markedly from each other in genitalia, whilst on the other hand species which could be readily distinguished from each other by maculation and color possessed genitalia so similar that no definite points of distinction could be found in these organs.

The first group centers around *permundanum* Clem.; our determination of this species is based on a study of the descriptions of Clemens and Zeller and agrees with specimens in the collection determined as this species by Kearfott and Busck; a figure of the clasper is given (c. f. fig. 1). As at the present time it is impossible to examine Walker's type specimens the synonymy as given in Dyar's List is accepted. Several apparently unnamed species are herewith described.

Exartema troglodanum sp. n. (Fig. 2).

Maculation very similar to that of *permundanum* but the general impression given is that of a much darker insect due to the dark bands being thickly covered with rather bright brown scales; the pale lines defining these dark areas are also much less evident in this new species than in *permundanum*. Basal dark area slightly sprinkled with light scales, its outer border is outwardly oblique from costa at ¼ to center of wing, then almost perpendicular to inner margin with a slight concavity in the fold. The median band shows very dark shading at costa and the same two projections of the outer border found in *permundanum;* below these the band is completely cut by a narrow line of paler ground color. The anal spot is large and triangular and the oblique subapical dark band is broadly joined to the first dark costal spot. Pale areas with considerable purplish silvery iridescence and cut by a central dark line; fringes pale yellowish, cut at apex and above anal angle with dark scales. Secondaries dark smoky with pale fringes. Expanse 16-18 mm.

Holotype,—1 ♂, Meach Lake, Que. (C. H. Young) (June 17), in Canadian National Collection.

Paratypes,—1 ♂, 2 ♀'s, Ottawa, Ont. (C. H. Young) (June 27, 28), in same Collection.

Exartema furfuranum sp. n. (Fig. 3).

Color and maculation of *permundanum* but slightly more greenish olivaceous and with the pale areas much more strigate with darker lines and dashes; all dark bands very distinctly outlined with pale ochreous. The two outer projections of the median band are very long, the upper one almost touching the oblique subapical band which ends at a point opposite this tooth and does not connect with the dark costal spots. Fringes dusky. Secondaries deep smoky with paler fringes. Expanse 16 mm.

Holotype,—1 ♂, Ottawa, Ont. (C. H. Young) (June 20), in Canadian National Collection.

Paratypes,—1 ♂, 1 ♀, Meach Lake, Que. (C. H. Young) (June 20, 21), in same Collection.

Exartema rusticanum sp. n. (Fig. 4).

Usual type of maculation; pale areas very decidedly silvery-purplish; dark bands suffused with ruddy scales, especially prominent in outer areas (in worn specimens not so noticeable). The two outer projections of median band are short and the lower one quite thick, the space between the two containing a pale ochreous spot; there is also a bluish spot at base of lower tooth enclosed in dark area; the triangular anal spot is generally connected with the oblique subapical band by a fine network of lines, as is also this band with the first costal spot. A thick dark line at base of fringes which are pale, checkered irregularly with black. Secondaries dark smoky. Expanse 15-16 mm.

Holotype,—1 ♂, Onah, Man. (N. Criddle) (July 17), in Canadian National Collection.

Paratypes,—2 ♂'s, 2 ♀'s, Onah, Man. (N. Criddle) (July 17-19), in same Collection.

The genitalia are similar to those of the preceding species but the two species can be readily separated by color and maculation. A ♀ specimen from Trenton, Ont., appears to belong here; it had been identified by Kearfott as *zellerianum* Fern. but Zeller's figure represents quite a different type of maculation and I cannot agree with this determination.

Exartema fraternanum sp. n.

Very similar to preceding species in maculation and genitalia but lacking the ruddy tinges and with pale areas distinctly less silvery, resembling in this respect a small dark form of *permundanum*. The teeth of the median band are less blunt and wider apart than in *rusticanum* and there is no pale area below the inner tooth with the exception of a couple of hair-lines joining the costal and inner portions, this latter being goblet-shaped with short stem resting on inner margin. Oblique subapical band dark, much thickened in upper portion, joined by a fine line to costal spot and also to anal triangular spot Secondaries dark smoky with pale fringes.

Holotype,—1 ♂, Ottawa, Ont. (July 3) (C. H. Young), in Canadian National Collection.

Exartema bolandanum sp. n. (Fig. 5).

Very similar to *olivaceanum* Fern. and of the same type of genitalia; the general appearance of primaries is more mottled than in *olivaceanum;* the best point of distinction is found in the subterminal area, the oblique band being broader and closer to apex of wing in *bolandanum* with a narrow line of dark scales extending down to anal angle; the apex of the triangular dark spot on inner margin is joined to the center of the oblique band by a narrow dark line and the included pale space above tornus is bisected by another dark line running from the first line to anal angle. Fringes pale at apex and anal angle, dark centrally. Expanse 13 mm.

Holotype,—1 ♂, Ottawa, Ont. (June 10) (C. H. Young).

Exartema versicoloranum Clem.

Exartema versicoloranum Clem. 1860, Proc. Acad. Nat. Sci. Phil., 357.

Sericoris versicoloranum Clem. 1865, Proc. Ent. Soc. Phil., 136.

The original description of this species is very vague and might apply to several species; in his second paper however Clemens states that the species is ordinarily distinguished by the white or yellowish-white costa at the base of wing and the white space toward the hinder margin. There is a single ♂ specimen in the Canadian National Collection from Trenton, Ont. (Aug. 1) which agrees with the above diagnosis, but differs markedly in genitalia from an Ottawa series, captured in June, under the same specific name. As however this latter series fits in excellently with Zeller's description of *appendiceum,* at present listed as a synonym of *versicoloranum* Clem., I propose to use *versicoloranum* Clem. for the species with white costa at base and resurrect *appendiceum* Zell. from the synonymy for the very similar species with dark basal area.

Exartema valdanum sp. n.

Basal and median areas dark olivaceous black-brown, separated by a band of whitish color containing a few dark dots in form of a broken central line; this pale band is upright with margins slightly waved. Median band outwardly with two blunt teeth and an indentation of pale color below inner tooth. The usual dark triangular spot near anal angle and an oblique band running inward from center of outer margin and joined to first costal spot by fine line; a narrow dark area below apex sending hair-lines to costal spots and separated from subapical band by a narrow band of whitish. Remainder of outer area pale, same color as inner band, slightly clouded with smoky. Fringes irregularly checkered black and white. Secondaries dark smoky with pale fringes. Expanse 17 mm.

Holotype,—1 ♂, Ft. Coulonge, Que., (July 7) (S. A. Graham), in Canadian National Collection.

Allotype,—1 ♀, Aylmer, Que. (May 29) (J. McDunnough).

The type of genitalia is that of *permundanum* but the pale bands of primaries rather recall *fasciatanum* Clem.

Exartema nananum sp. n.

Thorax light brown; primaries with usual type of maculation, the dark

areas cinnamon-brown, the pale bands and spots bluish-silvery. Basal area with outer margin bulging outwardly, sprinkled with a few bluish scales in costal half of wing. Antimedian pale band cut by a central brown line. Median brown band with inner margin slightly concave, composed of an upper boot-shaped spot and a lower subquadrate spot joined together narrowly at heel of boot and also near the toe, enclosing a pale bluish spot; there is also a projection on outer margin of the band below costa. The subapical oblique band is thickened in its middle and joined to the first costal spot, the toe of the boot and the anal triangular spot by fine lines, the enclosed areas being of the bluish-silvery color of the antemedian band. Terminal area narrowly brown with a fine bluish line bordering the oblique band outwardly. A dark terminal line. Fringes slightly bluish with dusky apical and median areas. Secondaries smoky with lighter fringes. Expanse 12 mm.

Holotype,—1 ♂, Mer Bleue, Ottawa, Ont. (July 20) (C. H. Young), in Canadian National Collection.

The type of genitalia is that of *permundanum*.

Exartema bicoloranum sp. n.

Primaries cinnamon-brown beneath which towards the base an underlying area of black scaling may be seen with a lens; all maculation very indistinct, consisting of the usual bands and spots in a slightly deeper brown than the general ground color, rather better defined in outer area, where the outer edge of the median band, the anal triangular spot and the oblique subapical band are visible, the latter defined by narrow lines of purplish; a dark terminal line; fringes pale ochreous tinged with smoky. Secondaries pure white, with a smoky terminal border, broadest at costa; fringes pale. Expanse 13 mm.

Holotype,—1 ♂, Barrington Passage, N. S. (July 10) (C. H. Young), in Canadian National Collection.

The type of genitalia is similar to that of *furfuranum* and *rusticanum;* the white secondaries readily distinguish the species from others of the genus.

Exartema submissanum sp. n.

Primaries dull cinnamon-brown with a purplish tinge due to a strong striation of brown scales on a purple ground color; maculation very indistinct, best defined in terminal area, brighter brown than ground-color without purple tinge. Median band with a sharp outward angle below costa, then more or less perpendicular to inner margin, rather narrow; anal triangular spot small, more or less joined to median band; oblique subapical band most distinct of all the maculation, narrow, of even width throughout, joined by a fine line to first costal spot; apex streaked with brown. Dark terminal line; fringes pale ochreous, shaded with smoky. Secondaries whitish hyaline at base shaded with smoky outwardly, forming a more or less diffuse outer dark border. Expanse 16 mm.

Holotype,—1 ♂, Ottawa, Ont. (July 23) (C. H. Young), in Canadian National Collection.

Paratypes,—3 ♂'s, 1 ♀, Ottawa, Ont. (July 17, 23) (C. H. Young), in same collection.

The species resembles somewhat the preceding but is larger with less distinctly white secondaries and the genitalia are of the *permundanum* type. According to Zeller's figure and description it would appear to be fairly close to *zelleranum* Fern. lacking however the prominent tooth of the median band.

Exartema terminanum sp. n. (Fig. 6).

Basal 4/5 of primaries deep purplish-black with a few purple shining striae arising from pale costal spots antemedially indicating the usual pale band. The outer 1/5 of wing is pale ochreous crossed by the blackish subapical band which loses itself in the dark area, is of even width throughout and slightly bent; a few dark streaks at apex and tornus of wing. The usual dark median band is slightly indicated by curved purple striae on its outer edge. Fringes pale ochreous tinged with smoky. Secondaries light smoky, paler in basal area. Expanse 14 mm.

Holotype,—1 ♂, Ottawa, Ont. (July 1), (J. Fletcher), in Canadian National Collection.

Paratypes,—1 ♂, 2 ♀'s, Ottawa, Ont. (July 10, 14, 28) (C. H. Young), in same collection.

This may be merely a form of *concinnanum* Clem. as it has the same type of genitalia. In any case, on account of the striking coloration, it would seem worthy of a name.

Argyroploce capreana Hbn.

There are before me four species belonging to this group and all closely allied. *Capreana* may be best distinguished by a small comma-like white mark jutting in from the white apical area to the outer margin of the dark basal area about the center of the wing. It is represented in the National Collection by specimens from Ottawa, Trenton and Sudbury in Ontario, one male from Nordegg, Alta., and one male from Vancouver, B. C. If identifications made by Mr. Kearfott are correct, *frigidana* Pack. would appear to be a synonym of this species.

The other species appear to be undescribed. I have carefully compared them with existing descriptions of North America species and also figures and descriptions of the allied European species and cannot match them. I therefore offer the following descriptions.

Argyroploce youngana sp. n. (Fig. 7).

Rather larger than *capreana* but very similar in general appearance. Basal 2/3 of primaries dark purplish-brown, blotched with still darker markings; the costal area, however, for about half the length of wing, is shaded with white, enclosing a quadrate dark patch near base of wing. The outer margin of the dark area is sharply and evenly defined, being perpendicular to below cell, then forming a distinct angle and outwardly oblique to inner margin just before tornus. Apical 1/3 white, clouded with purple-gray at apex, with two dots of similar color on costa from which proceed faint wavy subparallel gray shades crossing obliquely to outer margin. Fringes smoky slightly checkered. Secondaries dull smoky with paler fringes. Expanse 19-20 mm.

Holotype,—1 ♂, Meach Lake, Que. (July 20) (C. H. Young), in Canadian National Collection.

Paratypes,—1 ♂, Chelsea, Que. (July 6); 6 ♀'s, Meach Lake (Aug. 5), Ottawa, Ont. (July 4, 6, 11, 25, 28) (C. H. Young).

The male genitalia have the arm of the clasper narrowed for a considerably greater length than is found in *capreana;* there are also differences in the gnathos and the spining of the aedoeagus.

Argyroploce deceptana sp. n. (Fig. 8).

Much smaller than preceding species; evidently allied to the European *sauciana*. Basal 2/3 of primaries brown, slightly sprinkled with white scales forming a more or less evident dash from base through center of wing; a small dark quadrate patch on costa near base and a larger one near outer edge of dark area; several irregular dark blotches in central portion of wing. Outer 1/3 of wing white, the dividing line not very sharply demarcated; a white hook projects into the dark area below cell, leaving a distinct blackish ocellus-like mark, much as in *separatana* Kft., standing out on the margin of the white area; a triangular anal spot is partially separated by pale scaling from the basal dark area. The apex of wing is shaded with brown and directly below this a short blackish oblique subapical band is present, not attaining however to costa. Fringes dusky whitish at anal angle. Secondaries pale smoky, darker outwardly. Expanse 15 mm.

Holotype,—1 ♂, Ottawa, Ont. (June 5) (C. H. Young), in Canadian National Collection.

Paratypes,—2 ♀'s, Meach Lake, Que. (June 17), Ottawa, Ont. (June 24), taken by same collector.

Argyroploce tertiana sp. n. (Fig. 9).

Primaries with basal 2/3 purplish-brown, sprinkled with bright brown and with several darker blotches centrally; the beginning of an antemedial pale band is visible in a patch of whitish scaling on costa, partially obscured by brown dots; outer margin of dark area oblique and rather irregular; outer 1/3 of wing white, considerably obscured by dark shading, much more so than in preceding species; three dark dashes along costa; apex of wing dark, shaded with bright brown which continues downward along outer margin; a dark oblique subapical band, not attaining costa and shaded with light brown scales; the space between this band and the dark basal area is almost completely occupied by a broad grayish shade sprinkled with brown, extending upwards from anal angle to a point opposite cell and broadest at its apex which is truncate; a dark terminal line; fringes dusky. Secondaries smoky, paler basally. Expanse 16 mm.

Holotype,—1 ♂, Ottawa, Ont. (June 25) (C. H. Young), in Canadian National Collection.

Allotype,—1 ♀, Ottawa, Ont. (June 5) (A. Gibson), in same collection.

The ♀ shows more ruddy scaling below apex of wing and the dark basal area is continued along costa to include the first costal dash; the secondaries are also darker. I believe these differences are merely sexual.

Argyroploce buckellana sp. n. (Fig. 10).

Allied to the preceding species, especially the ♀, in type of maculation but distinct in genitalia. Primaries dark brown, shaded with blackish, with inconspicuous whitish antemedian band and outer ¼ of wing dark brown with blackish shading and with a few orange scales on inner margin at base; the outer edge of this area outwardly oblique to beyond cell, then perpendicular to inner margin; white antemedian band heavily sprinkled with brown scaling and not well defined; median broad oblique dark band of even width throughout, outer edge rather irregular in outline and attaining inner margin just before tornus; beyond this band the ground color is white but so heavily shaded with purplish-gray as to leave the white area only distinct as a fine border line to the median band and a paler area at tornus; this pale edging forms a slight white comma-mark on the dark margin of median band opposite cell; three whitish geminate dashes on costa before apex, a dark apical spot and a short curved dark sub-apical band; a ruddy-brown terminal line; fringes smoky, mixed slightly with brown and white. Secondaries deep smoky with paler fringes cut by a dark basal line. Expanse 15 mm.

Holotype,—1 ♂, Salmon Arm, B. C. (May 28) (W. R. Buckell), in Canadian National Collection.

I take much pleasure in naming the species after the collector, Mr. W. R. Buckell, who has through his careful and painstaking collecting added considerably to our knowledge of British Columbian Lepidoptera.

Argyroploce sordidana sp. n.

Size and general maculation of *glitranana* Kft. but of a much darker appearance, due to the fact that the pale areas between the dark bands are only slightly lighter in color than the bands themselves. Basal area of primaries black, overlaid heavily with brown and ochreous scaling and interrupted by several bluish-silvery dots; median band similar in color to basal area, in shape much as in *glitranana;* the paler space between basal area and median band is defined by two subparallel bands of bluish-silvery spots the included area being scaled with brown, without the underlying blackish color. A triangular anal spot and broad subapical band similar in color to median band, all their edges defined by silvery scaling; remaining areas similar to antemedian band in color. A row of dark spots along costa bordered with pale ochreous and a dark terminal line. Fringes deep smoky, slightly paler below apex. Secondaries deep smoky, almost black, with pale fringes. Expanse 16 mm.

Holotype,—1 ♂, Coliseum Mt., Nordegg, Alta., 6500 feet. (July 12) (J. McDunnough), in Canadian National Collection.

Paratypes,—3 ♂'s from same locality (July 7, 12, 18).

Argyroploce thallasana sp. n.

Allied in size and structure to *duplex* Wlshm. Primaries with basal two thirds dull purplish washed with olivaceous-brown which color forms a faint basal patch and is most prominent as a large irregular patch on inner half of wing, covering the area between anal angle and middle of inner margin. Outer half of wing olivaceous with small brown apical spot and slight brown shading along outer margin. Costa beyond middle with four pairs of pale ochreous

dashes separated by black and giving rise to irregular silvery-purple lines; from the first pair arise two lines very oblique outwardly below costa then broadening and irregularly perpendicular to inner margin, cutting through the dark patch and attaining margin near anal angle; oblique streaks from the second and third pairs of dashes coalesce to form a purple stripe which curves and runs subparallel to outer margin, bifurcating above anal angle; from outer of the last pair of dashes a short purple streak extends to outer margin below apex defining the brown apical spot. Some pale terminal dots, most evident above anal angle. Fringes mixed pale and smoky with dark basal line. Secondaries smoky with paler fringes. Expanse 22 mm.

Holotype,—1 ♂, Awemé, Man. (June 17) (N. Criddle), in Canadian National Collection.

Paratypes,—2 ♀'s, Aweme, Man. (June 25); Lauder, Man. (Aug. 1), by same collector.

Argyroploce aspasiana sp. n. (Fig. 13).

Allied to *instrutana* Clem. in color and maculation but much smaller. Base of primaries dark olivaceous-brown with considerable white scaling at extreme base; a whitish transverse antemedian band cut by a brown central hair-line; the band is slightly excurved below costa and the edges are rather irregular; median dark band composed of ruddy-brown scaling on a dark ground-color giving a decided olivaceous-brown tinge; the outer edge is strongly outwardly oblique from costa to centre of wing where it forms a prominent projection and then bends inward to inner margin, the width of band in centre of wing being twice the width of same at costa and inner margin; the apex of the projection is scaled with black; a long narrow triangular brown spot before anal angle and a broad similarly colored oblique subapical band extending from costa to below middle of outer margin and containing a dull leaden patch opposite the cell; intervening pale areas are silvery with scattered white scaling; apex of wing brown, cut by a silvery streak, and with three geminate white streaks at apical portion of costa and a pale line below apex on outer margin. Fringes dusky, slightly cut by brown. Secondaries smoky with paler fringes. Expanse 11 mm.

Holotype,—1 ♂, Mer Bleue, Ottawa, Ont. (July 3) (C. H. Young), in Canadian National Collection.

Paratypes,—1 ♂, 2 ♀'s, same locality and collector, (July 2-3).

The male genitalia are so different as to almost suggest another generic reference but I can see no other structural differences to warrant this at present. The uncus and tegumen are strongly chitinized and the former is long and pointed; the gnathos is well developed but the socii are lacking.

A study of genitalia of series before me from Ottawa, Ont., and Nordegg, Alta., shows that there are several quite distinct species in the difficult *campestrana* group which as yet are unnamed. One of these may possibly prove to be *glaciana* Moesch. but as none of them fits very closely the description and figure of this species (1860, Wien. ent. Monatsschr. IV, 380) and as it is impossible at the present time to get information concerning the genitalia of the type specimen, I venture to propose names for all of these species as follows:—

Argyroploce castorana n. sp. (Fig. 12).

Thorax, palpi, head and abdomen black-brown; primaries black-brown crossed by a white antemedian band and with the apical ½ more or less of the same color. Basal area deep black-brown, the outer edge rather evenly convex with a slight outward projection below cell; white antemedian band with outer edge only slightly irregular and with faint dark central hair-line; median band broad, dark black-brown, slightly suffused with purplish scaling, broadest on inner margin where it is extended to include the triangular anal patch, the outer edge being irregularly concave from costa to above vein 2 and then perpendicular to inner margin just before tornus; on this outer edge in the central area of wing a round blackish spot is more or less distinctly visible, defined on its upper inner edge by a white dot; subterminal area white with a few dark striations and with two black costal spots, separated by white areas through which a fine black hair-line runs; opposite cell is an irregular dark shade which at times connects with the terminal dark area and also with the median band above tornus; apex and outer margin of wing rather broadly black-brown, narrowing to just above anal angle. Fringes smoky, paler at anal angle, with a darker basal line. Secondaries pale smoky with paler fringes which show a dark basal line. Expanse 17 mm.

Holotype,—1 ♂, Nordegg, Alta. (July 7) (J. McDunnough), in Canadian National Collection.

Paratypes,—9 ♂'s, Nordegg, Alta. (June 24, 30, July 4, 5, 7) (J. McDunnough), in same collection.

. There is also a series before me from Ottawa, Ont., slightly smaller in size than the Nordegg specimen but with same type of genitalia. The species is best separated from *campestrana* by the fact that *two* instead of *three* postmedian costal spots are present; in this feature it approaches *fuscalbana* Zell., which, however, besides differing in genitalia, has a brighter and more contrasted type of coloration.

Argyroploce polluxana n. sp. (Fig. 11).

Very similar to preceding species but with white areas more silvery-white, giving a more contrasted tone to the coloration. The antemedian white band sends a short rounded projection in the cell into the dark median area, and opposite this is a similar projection from the pale subterminal area; the triangular spot before tornus is not so entirely merged into the median area but is slightly defined inwardly by pale purplish shading; the subapical oblique streak is also partially separated from the dark apical area by paler purplish shading and at times bends backward towards apex of triangular patch; there are three dark costal spots, and the white subterminal area is more striated and blotched with dark color than in *castorana*. Expanse 18-19 mm.

Holotype,—1 ♂, Nordegg, Alta. (July 5) (J. McDunnough), in Canadian National Collection.

Paratypes,—5 ♂'s, same locality and collector (July 7, 14, 20).

The species were taken along with the preceding in a mixed spruce and tamarack swamp. There are a number of specimens from Ottawa, Ont., in the Canadian National Collection which show the same type of maculation and genitalia as the type specimens.

Argyroploce carolana n. sp. (Fig. 14).

Very similar in maculation to the two preceding species but smaller and with a decided olivaceous tinge to the dark areas. In contradistinction to the allied forms the patagia are white with the exception of a dark patch at base, the thorax is also crossed by white bands; on the primaries the outer edge of the basal dark area tends to become irregular, showing (in two specimens) slight rounded excavations in cell and on submedian fold; the outer edge of the dark median band shows a downward indentation of white color at the apex of the triangular patch, which patch is joined to the median area; the subterminal white band is narrow, the whole terminal area being broadly (except at costa and anal angle) suffused with olivaceous brown; there are two olive-brown costal spots which may or may not be connected by hair-lines with the dark terminal area. Expanse 14 mm.

Holotype,—1 ♂, Ottawa, Ont. (June 21) (C. H. Young), in Canadian National Collection.

Paratypes,—1 ♂, same locality and collector (June 24); 1 ♀, Trenton, Ont. (June 11) (J. D. Evans) in same collection.

The type of genitalia is remarkably distinct.

Argyroploce vulgana n. sp. (Fig. 15).

Similar in type of maculation to the three preceding species but in the male sex with the pale areas much duller and largely suffused with dark striations. Basal area and median band dull olivaceous-brown, the latter in shape similar to that of *castorana* and with a fairly evident blackish dot at end of cell; antemedian pale band often very indistinct and at times not attaining inner margin; subterminal pale area reticulate with olive-brown and with two dark costal spots; the dark color of apex and terminal area forms roughly a triangular blotch of which the outer margin is the base; at times this area can be differentiated into an apical blotch and a subapical oblique streak, due to slightly paler scaling between the two component parts; fringes dark at apex, mixed pale and smoky in other areas. Secondaries dull smoky.

In the female the white areas are quite prominent and sharply defined. Expanse, ♂, 15 mm., ♀, 14 mm.

Holotype,—1 ♂, Nordegg, Alta. (July 9) (J. McDunnough), in Canadian National Collection.

Allotype,—1 ♀, Nordegg, Alta. (July 11) (J. McDunnough), in same collection.

Paratypes,—12 ♂'s, 1 ♀, same locality and collector, taken on various dates from June 27 to July 14.

The species was quite common in the muskeg around bushes of dwarf birch on which it probably feeds. The type of genitalia is remarkably distinct.

Argyroploce nordeggana n. sp.

Primaries olivaceous-brown, banded with silvery-white. Basal area dark, the outer edge forming a strong truncate projection in the cell; antemedian band broad, silvery-white with three dark costal dots from central of which a wavy olivaceous line arises, bisecting the band and tending to connect by fine lines with the dark areas on both sides, thus dividing the white area into numerous small

quadrate patches. Median band dark, upright, rather narrower than usual, almost bisected by projections of the surrounding pale area just above submedian fold, the upper portion with two blunt tooth-like projections on its outer margin; this dark area is followed by a subterminal silvery band with central dark line arising from costal spot and with same tendency to divide up into small rectangular patches as in the antemedian band; the pale band bifurcates above anal angle and encloses a large ovate dark spot; the remainder of the wing is occupied by a net-work of olive-brown lines and bands enclosing small patches of leaden-colored scales and containing two geminate white dashes on costa; fringes mixed smoky and white with dark basal line. Secondaries dull smoky. Expanse 20 mm.

Holotype,—1 ♂, Nordegg, Alta. (July 14) (J. McDunnough), in Canadian National Collection.

Paratype,—1 ♂, same locality and collector (July 18).

A female specimen which we are inclined to associate with this species is whiter, especially in the apical area; where the dark bands are reduced and the leaden-colored scales replaced by white ones.

A NEW LITHOBIID OF THE GENUS PAOBIUS.

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Through Dr. J. McDunnough I have received for identification a specimen of a diplopod and two specimens of a chilopod collected in Alberta, Canada, by Mr. N. B. Sanson of Banff. The diplopod is apparently a not fully mature male *Parajulus hewitti* Chamberlin, a species described originally from specimens taken by Dr. Hewitt at Agassiz, B.C. The present specimen is much darker in color than the type, with the legs nearly chestnut. The cauda is very similar though somewhat shorter and the lateral striae are more pronounced. It was taken nearing Bryant Creek Cabin, Sept. 22, 1921.

The chilopods represent a new species in the genus *Paobius* of the family Lithobiidae. In the key to species given by the writer in his review of the genus* the present species runs out to *P. orophilus* Chamberlin, a British Columbian species from which, however, it is clearly distinct. The key may be modified to take in the new form as follows:

a. Dorsal spines of anal legs 1, 0, 3, 0, 0 or 1, 0, 2, 0, 0.

b. None of the posterior coxae laterally armed; ventral spines of thirteenth legs 0, 1, 3, 3, 1; third joint of first ten or more pairs of legs with but two dorsal spines.....*P. vagrans* Chamb.

b.[1] Last two pairs of coxae laterally armed. Ventral spines of thirteenth legs 0, 1, 2, 3, 2 or 0, 0, 2, 3, 2; third joint of all legs with three dorsal spines.....*P. boreus* Chamb.

a.[1] Dorsal spines of anal legs 1, 0, 3, 1, 0.

b. Dorsal spines of penult legs 1, 0, 3, 1, 1 .....*P. albertanus*, sp. nov.

b.[1] Dorsal spines of penult legs 1, 0, 3, 1, 0.

*Bull. Mus. Comp. Zool., 1916, 57, p. 162.

c. Fifth joint of sixth to ninth pairs of legs with but one ventral spine; head equal in length and breadth; claw of genital forceps of female tripartite.....*P. columbiensis* Chamb.

c.[1] Fifth joint of sixth to thirteenth pairs of legs with two ventral spines; head wider than long; claw of genital forceps of female bipartite .....*P. orophilus* Chamb.

Paobius albertanus sp. nov.

Dorsum brown of a slightly chestnut cast, the head similar, typically with a darker spot on posterior half. Head slightly wider than long. Ocelli in three series, nine to twelve in number. Antennae rather long; articles all relatively long, the last one equal in length to the two preceding ones taken together.

Prosternum and its teeth much as in *P. orophilus;* the distance between chitinous spots similarly four times as long as the dental line.

Ventral spines of penult legs 0, 1, 3, 3, 2; dorsal spines, 1, 0, 3, 1, 1; claws three of which the anterior is straight and spine-like. Ventral spines of anal legs 0, 1, 3, 3, 1; dorsal spines 1, 0, 3, 1, 0; claw single. Last four pairs of coxae laterally armed.

Claw of female genital forceps distinctly tripartite; basal spines proportionately broad as in *P. vagrans,* the inner on each side smaller than the outer. Length of male, 9 mm.; of female, 11 mm.

Locality.—Canada: Alberta. One male and one female taken by N. B. Sanson on "the Spring Lakes trip" April 25 and 26, 1918.

Differs from all the previously known species in the spining of the penult legs.

NOTE ON TYPES OF *ERNESTIA* R. D. (DIPTERA)

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The type of *Ernestia nigrocornea* Tothill is in the California Academy of Sciences and not in the Canadian National Collection as stated by the author in Canadian Entomologist, 1921, p. 228.

Great Falls, Va., is the type locality of *E. platycarina* Tothill (l. c. p. 271) and the number of the type is 24357 and not 24359.

Lillooet, B. C., is the type locality of *E. sulcocarina* Tothill (l. c. p. 272). Bear Lake, B. C., is the type locality of *E. bicarina* Tothill (l. c. p. 272).